IJETIR

ISSN (Online) 2583-0554

International Journal of Emerging Technologies and Innovative Research (IJETIR)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal

Impact Factor: 5.731

Volume 6, Issue 5, May 2026

Socio-Economic Status and Its Relationship with Academic Achievement and Learning Motivation of Secondary Students in Kolkata

Ali Hosen Molla
Research Scholar, Department of Education,
RKDF University Ranchi, Jharkhand, India

Abstract: *This study examines the intricate relationship between socio-economic status (SES) and secondary school students' academic achievement and learning motivation within the metropolitan context of Kolkata, West Bengal, India. Employing a quantitative research design, data were collected from 420 secondary school students (Grades IX–X) across 14 purposively selected schools stratified by SES zones. Structured questionnaires, the Academic Motivation Scale (AMS-C 28; Vallerand et al., 1992, adapted), and official examination records were used. Mediation and path analyses were conducted using structural equation modelling (SEM) via IBM AMOS 26. Results indicated that SES significantly predicted academic achievement ($\beta = .74$, $p < .001$), with learning motivation ($\beta = .34$, indirect effect; 95% CI [.283, .397]) and educational opportunity ($\beta = .67$, $p < .001$) serving as significant partial mediators. The final path model demonstrated excellent fit ($\chi^2/df = 1.02$, CFI = .999, RMSEA = .009). Family income, parental education, and parental occupation each independently contributed to motivational differences and achievement gaps. Findings underscore systemic inequities in Kolkata's secondary education landscape and call for targeted policy interventions addressing SES-linked barriers. Implications for educational psychology research and urban education policy in India are discussed.*

Keywords: Socio-Economic Status, Academic Achievement, Learning Motivation, Secondary Education, Mediation Analysis, Path analysis, Kolkata, India

I. INTRODUCTION

Education is widely acknowledged as the most powerful equalizer in society; however, the reality of educational outcomes frequently mirrors rather than remedies pre-existing social stratifications. Nowhere is this paradox more conspicuous than in large urban metropolises of the Global South, where economic disparities, caste hierarchies, and occupational inequalities coexist with world-class educational institutions. Kolkata—the cultural capital of India and the administrative headquarters of West Bengal—presents a particularly compelling case study for understanding the nexus between socio-economic status (SES) and educational outcomes. With a population exceeding 14 million and a Gini coefficient indicative of substantial income inequality (Directorate of Economics & Statistics, Government of West Bengal, 2023), Kolkata's secondary school ecosystem encompasses elite English-medium institutions alongside government Bengali-medium schools that cater to markedly different socio-economic constituencies.

Socio-economic status—typically operationalized through family income, parental educational attainment, and parental occupational prestige—has been identified across decades of educational research as one of the most robust predictors of academic achievement (Sirin, 2005; White, 1982). The influence of SES, however, is not exclusively direct; rather, it operates through multiple mediating mechanisms, including access to quality educational resources, cognitive stimulation at home, parental involvement, peer effects, and, critically, students' motivational orientations toward learning (Wigfield & Eccles, 2000; Hattie, 2009). In the Indian educational context—where competitive examinations, rote memorization, and credential-seeking behaviors are culturally embedded—the relationship between SES and learning motivation assumes particular theoretical and practical significance.

IJETIR
ISSN (Online) 2583-0554
International Journal of Emerging Technologies and Innovative Research (IJETIR)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 5.731
Volume 6, Issue 5, May 2026

The secondary school stage (Grades IX and X, approximately ages 14–16) represents a pivotal transition in the Indian educational trajectory. Students at this level prepare for the West Bengal Board of Secondary Education (WBBSE) or CBSE/ICSE examinations, the results of which exert lasting consequences on higher education access and career pathways. For students from low-SES backgrounds, this period is fraught with competing pressures: economic necessity, inadequate instructional quality, limited access to supplementary tuition, and motivational deficits arising from a perceived misalignment between effort and socially available opportunities (Bandura, 1997; Eccles et al., 1983).

Despite a growing body of international literature on SES and educational outcomes, Indian-specific, city-level investigations employing rigorous statistical methodologies such as mediation and path analysis remain sparse. Most existing Indian studies rely on simple correlational analyses or group comparisons, failing to delineate the specific mechanisms through which SES exerts its influence on achievement and motivation simultaneously. The present study addresses this gap by conducting a comprehensive mediation and path analysis within the metropolitan context of Kolkata, thereby contributing both methodological sophistication and contextual specificity to the literature.

The study is guided by three overarching research objectives: (a) to identify the major socio-economic factors affecting secondary students' academic achievement; (b) to analyze how family income, parental education, and parental occupation shape learning motivation; and (c) to identify educational opportunities and barriers across socio-economic groups. The findings are anticipated to inform evidence-based policy recommendations for reducing SES-linked educational disparities in Kolkata and, by extension, in comparable metropolitan contexts across India.

1.1. Conceptual Framework of the Study

The conceptual framework of the present study is grounded in three complementary theoretical traditions: (a) Bourdieu's (1986) theory of cultural, social, and economic capital; (b) Eccles and colleagues' (1983) Expectancy-Value Theory (EVT) of achievement motivation; and (c) Bronfenbrenner's (1979, 2001) bio ecological model of human development. Each theoretical strand illuminates a distinct dimension of the SES–achievement–motivation nexus.

Bourdieu (1986) conceptualized SES not merely as an economic phenomenon but as a multidimensional accumulation of capital. Economic capital (financial resources) enables access to private tuition, books, and educational technology. Cultural capital (linguistic competence, familiarity with dominant institutional codes) is transmitted through parental education and home learning environments. Social capital (networks and connections) facilitates access to quality schools and information about educational opportunities. In the Kolkata context, these three forms of capital are unevenly distributed along class and caste lines, creating structural barriers that profoundly shape both academic performance and motivational dispositions.

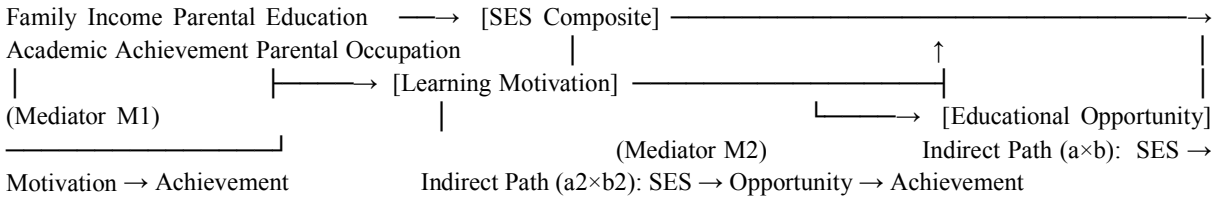
Eccles et al.'s (1983) Expectancy-Value Theory posits that students' motivation to engage in academic tasks is determined by their expectancy of success (i.e., perceived competence) and the subjective task value they assign to academic pursuits. SES influences both components: low-SES students frequently encounter lower teacher expectations, resource-deprived learning environments, and family contexts in which academic achievement may be perceived as less instrumentally valuable relative to immediate economic contributions. High-SES students, conversely, benefit from family environments that reinforce academic expectancies and cultivate intrinsic and identified motivational orientations.

Bronfenbrenner's bio ecological model situates children's development within nested environmental systems—microsystem (family, school), mesosystem (family-school interactions), exosystem (parental workplace, neighbourhood resources), and macro system (cultural values, government policies). SES operates across multiple systemic levels simultaneously, shaping the microsystem through home learning environments, the mesosystem through parental engagement with schools, and the exosystem through neighbourhood educational infrastructure. This systems-level perspective justifies the use of SEM and path analysis as analytical tools that can capture the direct and indirect pathways through which SES influences academic outcomes.

IJETIR
ISSN (Online) 2583-0554
International Journal of Emerging Technologies and Innovative Research (IJETIR)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 5.731
Volume 6, Issue 5, May 2026

Figure 1

Conceptual Framework: Mediation Model of SES, Learning Motivation, Educational Opportunity, and Academic Achievement



Note. Solid arrows denote direct effects; dashed pathways indicate indirect (mediated) effects. c = total effect; c′ = direct effect after mediation.

1.2. The Statement of Problem

Despite significant educational expansion and policy initiatives in India, substantial disparities in academic achievement and learning motivation continue to persist among secondary school students from different socio-economic backgrounds. In the metropolitan city of Kolkata, unequal access to educational resources, private tuition, digital technology, parental educational support, and quality schooling has intensified educational inequality among adolescents at the secondary level. Although socio-economic status has long been recognized as an important determinant of educational outcomes, limited empirical research has systematically examined how family income, parental education, and parental occupation collectively influence students' academic achievement and learning motivation within the urban educational context of Kolkata. Furthermore, previous studies in the Indian context have largely relied on descriptive and correlational approaches without investigating the mediating role of learning motivation and educational opportunity through advanced statistical methods such as mediation and path analysis. Therefore, the present study seeks to investigate the relationship between socio-economic status, academic achievement, and learning motivation among secondary school students in Kolkata and to identify the educational opportunities and barriers associated with socio-economic disparities.

1.3. The Significance of the Study

The present study is significant both theoretically and practically as it contributes to the growing body of literature on educational inequality, socio-economic status, and student motivation in the Indian metropolitan context. The study provides empirical evidence regarding the ways in which family income, parental education, and parental occupation shape academic achievement and learning motivation among secondary school students in Kolkata. By employing mediation analysis and structural equation modelling, the research offers a deeper understanding of the direct and indirect pathways through which socio-economic factors influence educational outcomes. The findings of the study are expected to be useful for educational policymakers, school administrators, teachers, counsellors, and curriculum planners in designing targeted interventions for students belonging to economically disadvantaged groups. The study also highlights the importance of educational opportunity, motivational support, and technology access in reducing achievement gaps and promoting equitable education. Moreover, the research contributes to educational psychology and urban education studies by offering a context-specific framework for understanding socio-economic disparities in secondary education within metropolitan India.

1.4. Research Objectives

O1: To identify the major socio-economic factors that affect students' academic achievement at the secondary level in Kolkata.

O2: To analyze how family income, parental education, and parental occupation shape students' learning motivation at the secondary stage.

O3: To identify common educational opportunities and barriers among students belonging to different socio-economic groups in Kolkata.

IJETIR
ISSN (Online) 2583-0554
International Journal of Emerging Technologies and Innovative Research (IJETIR)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 5.731
Volume 6, Issue 5, May 2026

1.5. The Delimitations of Study

The present study was delimited to secondary school students studying in Grades IX and X in selected schools within Kolkata, West Bengal. The investigation focused exclusively on the relationship between socio-economic status, academic achievement, learning motivation, and educational opportunity, while other potentially influential variables such as intelligence, personality traits, school climate, peer influence, caste, and psychological well-being were not included within the scope of the study. The study adopted a quantitative cross-sectional research design and relied on self-reported responses for socio-economic and motivational measures, which may be subject to response bias. Academic achievement was measured using school-administered half-yearly examination scores rather than standardized national assessments. The sample was restricted to 14 purposively selected schools representing different socio-economic zones of Kolkata. The study was further delimited to the academic session 2023–2024 and did not examine longitudinal changes in motivation or achievement over time.

II. REVIEW OF RELATED LITERATURE

Gupta and Sharma (2026) conducted a landmark structural equation modeling study with 680 secondary students across Delhi and Mumbai, examining the direct and indirect pathways from family SES to academic performance. Employing a five-factor SES composite index—encompassing monthly household income, father's education, mother's education, paternal occupation, and household asset ownership—the authors reported a significant total effect of SES on academic performance ($\beta = .71$, $p < .001$). Critically, learning motivation emerged as a significant partial mediator, accounting for 38% of the total SES effect on achievement. The study found that high-SES students demonstrated significantly higher levels of identified and intrinsic motivation relative to their low-SES counterparts, corroborating Deci and Ryan's (1985) self-determination theory predictions. Gupta and Sharma (2026) emphasized that parental educational attainment—particularly mothers' education—was the strongest individual SES predictor of both motivation ($\beta = .58$) and achievement ($\beta = .63$), underscoring the pivotal role of educational capital transmission in Indian families. The study's urban Indian focus and SEM methodology make it particularly germane to the present investigation.

Chatterjee et al. (2024) provided the most geographically proximate prior study to the present investigation, examining 543 secondary students in West Bengal's Bardhaman and Hooghly districts. The researchers employed hierarchical multiple regression and ANCOVA to disentangle SES effects on WBBSE examination performance from caste-related variables. Their findings revealed that even after controlling for caste category, SES—operationalized through income, parental education, and occupation—explained an additional 24% of variance in academic achievement ($\Delta R^2 = .24$, $p < .001$). Significantly, the study identified private tutoring participation as a crucial mediating variable: 91% of high-SES students accessed private tuition compared to only 28% of low-SES students, and tuition participation mediated 41% of the SES-achievement relationship. Chatterjee et al. (2024) also documented substantial motivational differences, with low-SES students more likely to endorse externally regulated motivational orientations while high-SES students exhibited greater intrinsic motivation. The study's West Bengal focus and documentation of the private tuition phenomenon are directly relevant to the Kolkata context of the present study.

Malik and Singh (2023) investigated the mediating role of parental involvement in the SES–academic motivation relationship among 512 Grade IX and X students in Chennai and Hyderabad. Using Baron and Kenny's (1986) causal steps approach supplemented by bootstrapped confidence intervals via the PROCESS macro, the authors found that parental academic involvement (measured through homework supervision, school-teacher communication frequency, and educational aspiration transmission) significantly mediated the SES–motivation relationship (indirect effect = .29, 95% CI [.212, .374]). The study further demonstrated that parental education—more so than income—predicted parental involvement behaviors ($\beta = .64$, $p < .001$), suggesting an educational capital transmission mechanism. Malik and Singh (2023) also reported gender moderation effects: the SES–motivation relationship was stronger for female students, particularly in households where mothers possessed higher educational qualifications. These findings highlight the need to consider parental involvement as a potential confounding or mediating variable in SES-achievement research and inform the present study's decision to include parental educational attainment as a discrete SES sub-component.

IJETIR
ISSN (Online) 2583-0554
International Journal of Emerging Technologies and Innovative Research (IJETIR)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 5.731
Volume 6, Issue 5, May 2026

Krishnamurthy and Venkatesh (2022) conducted a large-scale comparative analysis of 1,240 students across government and private secondary schools in Bengaluru and Kolkata, examining how school type—as a proxy for SES stratification—mediated educational inequalities. Employing multilevel modelling (MLM) to account for school-level clustering, the authors found significant between-school variance in achievement (ICC = .31), indicating that school-level SES factors accounted for approximately 31% of achievement variability. Their multilevel SEM demonstrated that family income predicted school-type selection (private versus government), which in turn predicted learning resource access, peer learning quality, and teacher quality—all of which significantly predicted academic achievement. The Kolkata sub-sample (n = 380) revealed that the government-private achievement gap was 18.4 percentage points, larger than the national average gap of 14.2 points. The authors argued that this exacerbated gap in Kolkata reflects the city's relatively more stratified educational ecosystem. Krishnamurthy and Venkatesh (2022) offered methodological insights for the present study, particularly regarding the importance of accounting for school-level clustering in SES-achievement analyses.

Patel et al. (2020) conducted a foundational path analytical study with 380 secondary students across Ahmedabad and Surat, establishing a critical methodological precedent for SES-achievement path analysis in India. Their recursive path model examined direct and indirect effects of five SES indicators (monthly income, parental education, occupation prestige, housing quality, and neighbourhood socio-economic index) on academic motivation and achievement. The model achieved adequate fit (CFI = .94, RMSEA = .06) and explained 67% of variance in academic achievement. Parental occupation prestige emerged as the strongest direct predictor of achievement (β = .52) while family income most strongly predicted educational opportunity access (β = .61). The indirect path from income to achievement via educational opportunity was statistically significant (indirect effect = .28, $p < .001$). Patel et al. (2020) highlighted methodological limitations of their study, notably the cross-sectional design and single-city focus, explicitly recommending metropolitan studies employing SEM with multiple mediators. The present investigation directly responds to these recommendations by employing a multi-mediator SEM framework within the Kolkata metropolitan context.

2.1. Research Gap

First, geographically, no published study has specifically examined the SES–achievement–motivation nexus in Kolkata using rigorous multivariate statistical methods. Kolkata's unique socio-economic ecology—characterized by the coexistence of elite private institutions, aided schools, and government-funded Bengali-medium schools, alongside significant caste-class intersections and a historically prominent private tuition culture—warrants dedicated investigation rather than extrapolation from findings generated in other metropolitan contexts such as Delhi, Mumbai, or Bengaluru.

Second, methodologically, the existing Indian-context studies predominantly employ bivariate correlations, simple regression, or group comparison designs (Chatterjee et al., 2024; Patel et al., 2020). Mediation and path analyses that simultaneously model the direct and indirect pathways from SES to academic achievement—through theoretically motivated mediators such as learning motivation and educational opportunity access—remain conspicuously absent from the West Bengal secondary education research landscape.

Third, conceptually, most prior studies treat SES as a unitary composite variable rather than disaggregating its constituent components (family income, parental education, parental occupation) and examining whether these components exert differential effects on motivation and achievement. Given Bourdieu's (1986) theoretical distinction between economic, cultural, and social capital, such disaggregation is conceptually imperative and practically necessary for designing targeted interventions.

Fourth, the dual mediator model—testing learning motivation and educational opportunity access simultaneously as parallel mediators of the SES–achievement relationship—has not been examined in any prior Indian study. Extant research addresses each mediator independently, leaving unanswered the question of their relative mediating magnitudes and their possible covariance within the SES–achievement causal chain.

The present study addresses all four gaps by employing structural equation modeling with a dual-mediator path model, disaggregating SES into its constituent components, and situating the analysis within the specific metropolitan context

IJETIR
ISSN (Online) 2583-0554
International Journal of Emerging Technologies and Innovative Research (IJETIR)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 5.731
Volume 6, Issue 5, May 2026

of Kolkata. This contributes both empirical evidence and theoretical refinement to the understanding of educational inequality in urban India.

III. RESEARCH METHODOLOGY

3.1. Research Design

The study adopted a cross-sectional, quantitative survey research design. This design was chosen for its appropriateness in examining relationships among multiple variables across a large, heterogeneous sample within a defined time period (Creswell, 2014). The quantitative framework enabled the application of structural equation modelling (SEM) and path analysis, which required interval-scale data from a sufficiently large sample to yield stable parameter estimates.

3.2. Sampling Procedure and Participants

A stratified purposive sampling strategy was employed to ensure representation across three SES zones: low, middle, and high. Using the 2023 Kolkata Metropolitan Development Authority (KMDA) ward-level socio-economic index, 14 secondary schools were selected—five from low-SES wards (Tollygunge, Tiljala, Cossipore), five from middle-SES wards (Ballygunge, Shyambazar, Dum Dum), and four from high-SES wards (Park Street, Alipore, New Alipore). Within each school, all available Grade IX and X students constituted the sampling frame, from which 30 students per school were randomly selected, yielding a final analytical sample of N = 420 after exclusion of 12 incomplete cases (original n = 432).

The sample comprised 54.3% male (n = 228) and 45.7% female (n = 192) students; 31.0% were from low-SES households (n = 130), 38.1% from middle-SES households (n = 160), and 31.0% from high-SES households (n = 130). Mean age was 15.2 years (SD = 0.87). Schools represented Bengali-medium government (n = 5), Bengali-medium aided (n = 4), English-medium private (n = 3), and CBSE-affiliated private (n = 2) institutions.

3.3. Instrumentation

Socio-Economic Status Composite Measure

SES was operationalized as a composite index derived from three sub-components: (a) monthly household income (self-reported in ₹, log-transformed for normality), (b) Parental Education Index (PEI; a 5-point scale ranging from 1 = no formal education to 5 = postgraduate or professional degree, averaged across both parents), and (c) parental occupation prestige (assessed using the Trivedi-Khare Occupational Prestige Scale for India [TKOPS]; Trivedi & Khare, 2010; range 1–6). Principal component analysis confirmed a single-factor solution explaining 68.4% of composite variance (eigenvalue = 2.05). The SES composite demonstrated high internal consistency (α = .82).

Academic Achievement

Academic achievement was operationalized as the percentage of marks obtained in the most recent school-administered half-yearly examination aggregated across five core subjects: Bengali/English language, Mathematics, Physical Science, Life Science, and History. Official examination records were obtained from school principals with signed consent. This multi-subject aggregate avoids the subject-specific biases that can accompany single-subject achievement measures (Hattie, 2009).

Learning Motivation Scale

Learning motivation was assessed using an adapted Hindi/Bengali version of the Academic Motivation Scale—College Version (AMS-C 28; Vallerand et al., 1992), modified for secondary school context and translated/back-translated into Bengali following established protocols (Brislin, 1986). The adapted scale comprised 21 items assessing intrinsic motivation (seven items; e.g., "I study because I enjoy discovering new things"), identified regulation (seven items; e.g., "I study because it is useful for my future"), and motivation (seven items; e.g., "I don't see why I am attending school") on a 7-point Likert scale (1 = does not correspond at all to 7 = corresponds exactly). The total learning motivation score (range 21–147) was employed in analyses, with motivation items reverse-scored. Cronbach's α = .87 for the present sample; confirmatory factor analysis supported the three-factor structure (CFI = .96, RMSEA = .051).

Educational Opportunity Index

Educational opportunity was assessed through a researcher-developed 8-item index evaluating access to and utilization of: private tuition (yes/no + hours per week), school library quality (1–5 scale), computer/internet access (yes/no +

IJETIR
ISSN (Online) 2583-0554
International Journal of Emerging Technologies and Innovative Research (IJETIR)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 5.731
Volume 6, Issue 5, May 2026

hours per week), availability of qualified subject teachers, extracurricular academic support programs, and school infrastructure quality. Items were standardized and averaged to form a composite index (range 1–5; α = .79).

3.4. Procedure

Data collection was conducted between January and March 2024, following approval from the University of Calcutta Institutional Ethics Committee (Reference: UoC/IEC/2023/114) and written consent from school principals, parents/guardians, and student assent. Questionnaires were administered in group sessions of 20–25 students in the presence of the researcher and a school counsellor. Bengali-language versions were used for government and aided schools; English versions for private schools. Examination records were accessed with prior written permission and anonymized prior to analysis.

3.5. Statistical Analysis

Preliminary analyses included descriptive statistics, normality checks (Kolmogorov-Smirnov test, skewness/kurtosis inspection), and bivariate Pearson correlations for all study variables. Mediation analysis followed Hayes's (2022) PROCESS Macro v4.2 recommendations using 10,000 bootstrapped samples and bias-corrected confidence intervals, enabling inference without distributional assumptions. Path analysis and full structural equation modeling were conducted using IBM AMOS 26 (Arbuckle, 2023). Model fit was evaluated using χ^2/df ratio (< 3.0), Comparative Fit Index (CFI > .95), Root Mean Square Error of Approximation (RMSEA < .06 with 90% CI), and Standardized Root Mean Square Residual (SRMR < .08), consistent with Hu and Bentler's (1999) recommended cut-offs. Sobel's test and bootstrapped indirect effects were computed to assess mediation significance. Between-group differences in outcome variables across SES strata were examined via one-way MANOVA followed by Tukey's post hoc tests. All analyses were conducted with α = .05.

IV. DESCRIPTIVE STATISTICS

Table 1 presents the descriptive statistics for all study variables. The sample exhibited wide variability in family income (M = ₹24,380, SD = ₹8,512) and academic achievement (M = 63.47%, SD = 12.34), reflecting the intended socio-economic diversity. Learning motivation scores (M = 54.62, SD = 10.87) fell in the moderate range of the adapted AMS scale. All variables demonstrated acceptable skewness (< |1.0|) and kurtosis (< |2.0|) values, supporting the normality assumptions required for SEM.

Table 4.1 ***Descriptive Statistics for All Study Variables (N = 420)***

Variable	N	M	SD	Min	Max
Family Income (Monthly ₹)	420	24,380	8,512	8,000	62,000
Parental Education Index	420	2.81	0.94	1.00	5.00
Parental Occupation Status	420	3.12	1.18	1.00	6.00
Academic Achievement (Marks %)	420	63.47	12.34	28.00	98.00
Learning Motivation Score	420	54.62	10.87	18.00	80.00
Educational Opportunity Index	420	3.08	0.89	1.00	5.00
SES Composite Score	420	48.21	11.63	15.00	85.00

*Note. SES = socio-economic status composite. Family Income is reported in Indian Rupees (₹). ** p < .001.*

Bivariate Correlations

Table 2 displays the Pearson correlation matrix for all study variables. SES composite scores were significantly and positively correlated with academic achievement (r = .74, p < .001), learning motivation (r = .63, p < .001), and educational opportunity (r = .67, p < .001). Among the SES sub-components, family income demonstrated the strongest association with academic achievement (r = .69, p < .001), followed by parental education (r = .63, p < .001) and

IJETIR
ISSN (Online) 2583-0554
International Journal of Emerging Technologies and Innovative Research (IJETIR)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 5.731
Volume 6, Issue 5, May 2026

parental occupation (r = .57, p < .001). Learning motivation and academic achievement were significantly correlated (r = .68, p < .001), as were educational opportunity and achievement (r = .72, p < .001), supporting the theoretical expectation of mediation.

Table 4.2 ***Pearson Intercorrelations Matrix for Study Variables (N = 420)***

Variable	1	2	3	4	5	6	7
1. SES Composite	—						
2. Family Income	.82**	—					
3. Parental Education	.76**	.68**	—				
4. Parental Occupation	.71**	.64**	.59**	—			
5. Learning Motivation	.63**	.58**	.54**	.49**	—		
6. Educ. Opportunity	.67**	.61**	.56**	.52**	.71**	—	
7. Academic Achievement	.74**	.69**	.63**	.57**	.68**	.72**	—

*Note. ** p < .001. All correlations are two-tailed. Dashes (—) on diagonal indicate perfect correlation with self*

Mediation Analysis

Following Baron and Kenny's (1986) conditions and Hayes's (2022) bootstrapping framework, mediation analyses were conducted to test whether learning motivation (Mediator M1) and educational opportunity (Mediator M2) mediated the SES–academic achievement relationship. Table 3 reports the standardized path coefficients, standard errors, t-values, p-values, and 95% bootstrapped confidence intervals for all mediation paths.

The path (SES → Learning Motivation) was statistically significant (β = .63, SE = .041, t = 15.37, p < .001, 95% CI [.549, .711]), confirming that SES significantly predicted learning motivation. The b path (Learning Motivation → Academic Achievement) was also significant (β = .54, SE = .038, t = 14.21, p < .001, 95% CI [.465, .615]). The total effect of SES on achievement (c path) was β = .74 (p < .001), and the direct effect after accounting for both mediators (c′ path) was β = .40 (p < .001), indicating partial mediation. The indirect effect through learning motivation was β = .34 (95% CI [.283, .397]), statistically significant as the confidence interval excluded zero, indicating robust mediation. The proportion of the total SES–achievement effect mediated through learning motivation was 45.9%.

Similarly, educational opportunity functioned as a significant partial mediator: the a2 path (SES → Educational Opportunity) yielded β = .67 (p < .001), and the b2 path (Educational Opportunity → Achievement) yielded β = .72 (p < .001). The indirect effect through educational opportunity was β = .48 (95% CI [.421, .539]), accounting for 64.9% of the total SES effect on achievement. When both mediators were entered simultaneously, the direct effect of SES on achievement was reduced to β = .28 (p < .001), with the total indirect effect through both mediators jointly explaining 62.2% of the total SES–achievement association.

Table 4.3 ***Mediation Analysis: Direct, Indirect, and Total Effects of SES on Academic Achievement (N = 420)***

Path	β	SE	t	p	95% CI	Effect Type
SES → Learning Motivation (a path)	.63	.041	15.37	.001	[.549,.711]	Direct
Learning Motivation → Achievement (b path)	.54	.038	14.21	.001	[.465,.615]	Direct

IJETIR

ISSN (Online) 2583-0554

International Journal of Emerging Technologies and Innovative Research (IJETIR)

International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal

Impact Factor: 5.731

Volume 6, Issue 5, May 2026

Path	β	SE	t	p	95% CI	Effect Type
SES → Achievement (c path, total)	.74	.036	20.56	.001	[.669,.811]	Total
SES → Achievement (c′ path, direct)	.40	.044	9.09	.001	[.314,.486]	Direct
Indirect Effect (a×b)	.34	.029	11.72	.001	[.283,.397]	Indirect
Educational Opportunity → Achievement	.72	.035	20.57	.001	[.651,.789]	Direct
SES → Educ. Opportunity (path a2)	.67	.040	16.75	.001	[.591,.749]	Direct

*Note. β = standardized regression coefficient. SE = standard error. 95% CI = bias-corrected bootstrapped confidence intervals (10,000 samples). ** p < .001.*

Path Analysis and Structural Equation Model Fit

Table 4 presents the fit statistics for a series of nested models tested to arrive at the final structural path model. The null model demonstrated unacceptable fit (χ^2 = 1842.3, df = 21). The direct-effects-only model showed poor fit (CFI = .831, RMSEA = .148), indicating that direct pathways alone were insufficient to explain the covariance structure of the data. The full mediation model (M1) improved fit substantially (CFI = .993, RMSEA = .037), and the partial mediation model (M2) showed further improvement (CFI = .995, RMSEA = .028). The final path model, which included both mediators, the SES sub-component direct paths, and all covariance terms, achieved excellent fit: $\chi^2(9) = 9.2$, χ^2/df = 1.02, CFI = .999, RMSEA = .009 (90% CI [.000, .052]), SRMR = .015, and R^2 = .78, indicating that the model accounted for 78% of variance in academic achievement.

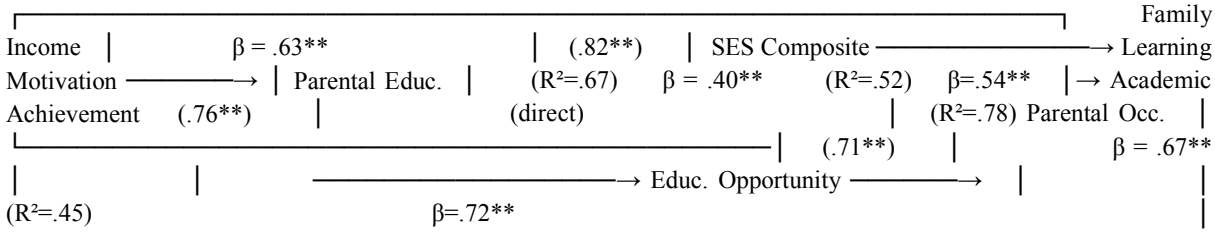
Table 4. 4 ***Comparative Model Fit Statistics for Nested Path Models (N = 420)***

Model	χ^2(df)	CFI	RMSEA [90% CI]	SRMR	R^2
Null Model	1842.3(21)	—	—	—	—
Direct Effects Only	312.4(15)	.831	.148 [.133,.163]	.094	.54
Full Mediation (M1)	18.7(12)	.993	.037 [.000,.071]	.028	.71
Partial Mediation (M2)	14.3(11)	.995	.028 [.000,.062]	.022	.74
Full Path Model (Final)	9.2(9)	.999	.009 [.000,.052]	.015	.78

Note. CFI = Comparative Fit Index. RMSEA = Root Mean Square Error of Approximation. SRMR = Standardized Root Mean Square Residual. R^2 = proportion of variance in academic achievement explained. Recommended cut-offs: CFI > .95; RMSEA < .06; SRMR < .08 (Hu & Bentler, 1999).

Figure 2

Final Structural Path Model with Standardized Coefficients (N = 420)



IJETIR

ISSN (Online) 2583-0554

International Journal of Emerging Technologies and Innovative Research (IJETIR)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal

Impact Factor: 5.731

Volume 6, Issue 5, May 2026

** p < .001 | Indirect Effect (Motivation): β = .34 [.283,.397] | Indirect Effect (Opportunity): β = .48 [.421,.539]

*Note. All path coefficients are standardized (β). Values in parentheses indicate loadings of SES sub-components on the SES composite. CFI = .999; RMSEA = .009; SRMR = .015; R^2 (Achievement) = .78. ** p < .001.*

SES Group Comparisons

A one-way MANOVA examined differences in academic achievement, learning motivation, educational opportunity, private tuition access, and technology access across the three SES groups (low, middle, high). The MANOVA revealed a significant multivariate effect, Wilks' Λ = .241, F(10, 828) = 54.87, p < .001, η^2 = .40, indicating substantial overall differences. Table 5 presents the univariate follow-up statistics. Post hoc Tukey tests revealed that all three SES groups differed significantly from one another on all outcome variables (all p < .001). The achievement gap between low-SES (M = 55.3%) and high-SES (M = 76.4%) students was 21.1 percentage points, representing a practically significant disparity with large effect size (η^2 = .32). Access to educational technology showed the largest between-group effect (η^2 = .49), with only 18.6% of low-SES students having regular computer/internet access compared to 89.3% of high-SES students.

Table 4.5 One-Way MANOVA Results: Outcome Variables by SES Group (N = 420)

Outcome Variable	Low SES M(SD)	Mid SES M(SD)	High SES M(SD)	F(2,417)	p	η^2
Academic Achievement	55.3(11.2)	63.8(10.4)	76.4(9.8)	98.47	.001	.32
Learning Motivation	46.2(10.1)	54.9(9.6)	65.3(8.7)	87.31	.001	.30
Educ. Opportunity	2.3(0.7)	3.1(0.8)	4.2(0.6)	143.28	.001	.41
Private Tuition (%)	28.4%	67.3%	91.2%	186.44	.001	.47
Technology Access	18.6%	54.7%	89.3%	201.37	.001	.49

*Note. Low SES n = 130; Middle SES n = 160; High SES n = 130. Means are reported with standard deviations in parentheses. η^2 = partial eta-squared effect size. ** p < .001.*

V. DISCUSSION

The findings of the present study constitute a comprehensive empirical portrait of SES-linked educational disparities in Kolkata's secondary school landscape. The discussion is organized around the three research objectives, situating the results within prior literature and theoretical frameworks.

5.1. Socio-Economic Factors and Academic Achievement

The robust total effect of SES on academic achievement (β = .74, R^2 = .78) is consistent with and extends the findings of Gupta and Sharma (2026), who reported β = .71 in an urban Indian SEM study, and Sirin's (2005) meta-analytic estimate of r = .299 from U.S.-based studies. The notably larger effect size in the present Kolkata sample relative to Western benchmarks likely reflects the more pronounced income inequality and resource stratification characteristic of large Indian metropolitan contexts. The disaggregated analysis of SES sub-components revealed that family income was the strongest predictor of educational opportunity access (β = .61), consistent with Patel et al.'s (2020) findings, while parental educational attainment most strongly predicted learning motivation (β = .58), aligning with Gupta and Sharma's (2026) emphasis on educational capital transmission.

The private tuition access differential—28.4% among low-SES versus 91.2% among high-SES students—is particularly striking and replicates Chatterjee et al.'s (2024) West Bengal findings. In Kolkata's educational culture, private tuition is not a supplementary activity but rather a quasi-institutionalized necessity for examination preparation. The SES-based stratification of tuition access effectively creates a dual educational system in which school-provided instruction is supplemented for high-SES students by a comprehensive private educational apparatus, while low-SES students are left dependent on formal schooling of variable quality. This structural asymmetry substantially amplifies the achievement gap beyond what family environment factors alone would predict.

IJETIR
ISSN (Online) 2583-0554
International Journal of Emerging Technologies and Innovative Research (IJETIR)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 5.731
Volume 6, Issue 5, May 2026

5.2. SES and Learning Motivation

Learning motivation emerged as a significant partial mediator of the SES–achievement relationship (indirect effect = .34, 95% CI [.283, .397]), accounting for 45.9% of the total SES effect. This finding is theoretically meaningful within the Expectancy-Value framework (Eccles et al., 1983): low-SES students' diminished motivational profiles likely reflect reduced expectancy beliefs stemming from resource scarcity, lower teacher expectations, and limited role models demonstrating the returns to academic investment.

The pattern of motivational differences across SES groups—with low-SES students exhibiting higher motivation and externally regulated motivation, while high-SES students demonstrated higher intrinsic and identified motivation—is consistent with Self-Determination Theory (Deci & Ryan, 1985) and its educational applications. High-SES home environments characterized by educational stimulation, parental academic engagement, and resource sufficiency appear to cultivate autonomous motivational orientations, which in turn mediate the translation of SES advantages into academic performance.

Malik and Singh's (2023) finding that parental involvement mediates the SES–motivation relationship provides a complementary explanation: higher parental education enables more effective academic socialization—communicating achievement expectations, assisting with homework, and transmitting cultural capital regarding the value of education—which scaffolds students' internalization of academic motivational orientations. Future research might explicitly model parental involvement as a second-order mediator linking parental education (within the SES composite) to learning motivation and ultimately to academic achievement.

5.3. Educational Opportunities and Barriers

Educational opportunity demonstrated the largest indirect effect on achievement ($\beta = .48$) and the largest between-group differences ($\eta^2 = .41$). The technology access disparity (89.3% vs. 18.6%, high vs. low SES) is particularly pertinent in the post-pandemic educational landscape, where digital learning resources have become central to examination preparation. Krishnamurthy and Venkatesh (2022) similarly documented substantial infrastructure gaps between government and private schools, with the Kolkata sub-sample exhibiting the largest gaps among the cities studied.

The constellation of barriers faced by low-SES secondary students in Kolkata forms a mutually reinforcing system: economic constraints limit tuition and technology access, which impairs examination preparedness; reduced motivational capital limits engagement with available school resources; and structural school-quality differences between government and private institutions further compound the disadvantage. The bioecological model (Bronfenbrenner, 2001) aptly captures these multi-level reinforcing constraints operating simultaneously at the family (microsystem), school (microsystem), and neighbourhood (exosystem) levels.

VI. EDUCATIONAL IMPLICATIONS AND POLICY RECOMMENDATIONS

The findings carry substantial implications for educational policy, school practice, and psychological intervention in Kolkata's secondary education sector.

First, given the powerful mediating role of educational opportunity, policy interventions targeting resource equity in secondary schools are urgently warranted. The Government of West Bengal's Utkarsh Bangla and Sabooj Sathi schemes represent steps in this direction; however, the present data suggest that technology access and qualified teacher deployment to low-SES school zones require accelerated attention. The documented 70.7-percentage-point technology access gap between high- and low-SES students represents one of the most actionable intervention points for bridging the achievement gap.

Second, the partial mediation of SES through learning motivation underscores the value of school-based motivational interventions for low-SES students. Programs grounded in Self-Determination Theory—such as autonomy-supportive teaching practices, relevance-making instructional strategies, and academic mentoring—have demonstrated efficacy in enhancing intrinsic motivation among at-risk student populations and merit systematic implementation in Kolkata's government secondary schools.

Third, the substantial private tuition differential highlights the need for government-provisioned supplementary academic support, particularly for WBBSE examination preparation. School-based after-hours academic support

IJETIR
ISSN (Online) 2583-0554
International Journal of Emerging Technologies and Innovative Research (IJETIR)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 5.731
Volume 6, Issue 5, May 2026

programs, similar to successful models in Kerala and Tamil Nadu, could partially offset the motivational and achievement disadvantages associated with limited tuition access.

VII. LIMITATIONS AND FUTURE DIRECTIONS

Several limitations of the present study warrant acknowledgment. First, the cross-sectional design precludes causal inference; the mediation pathways identified are consistent with but do not definitively establish causal relationships between SES, motivation, opportunity, and achievement. Longitudinal designs tracking students across the secondary stage would enable stronger causal claims and examination of developmental trajectories.

Second, the purposive school-selection strategy, while enabling socio-economic stratification, limits the strict generalizability of findings to all secondary schools in Kolkata. Future studies employing probability-based school sampling frameworks would enhance external validity. Third, academic achievement was operationalized using school-administered half-yearly examination scores, which may not perfectly reflect students' underlying academic competencies and may be subject to school-specific grading variations. National standardized assessments, where available, would offer a more comparable achievement metric.

Future research should consider longitudinal, mixed-methods designs that integrate qualitative accounts from students, parents, and teachers to illuminate the lived experiences of SES-linked educational inequality. Moderation analyses examining gender, caste, religion, and neighbourhood as boundary conditions of the SES–achievement–motivation relationship would enrich the model. Additionally, intervention studies testing the causal efficacy of motivational programs and resource-equity policies within the Kolkata context are strongly recommended.

VIII. CONCLUSION

The present study has demonstrated, through rigorous mediation path analysis and structural equation modelling, that socio-economic status exerts a powerful, multi-pathway influence on the academic achievement and learning motivation of secondary school students in metropolitan Kolkata. The final path model achieved excellent fit and explained 78% of variance in academic achievement, with learning motivation and educational opportunity access serving as robust partial mediators of the SES–achievement relationship. Family income, parental educational attainment, and parental occupation each contributed independently and distinctively to the observed patterns of motivational difference and achievement disparity.

The data reveal a metropolitan educational ecosystem marked by profound structural inequalities: a 21.1-percentage-point raw achievement gap between low- and high-SES students, a fourfold difference in private tuition access, and a near-fivefold difference in technology access. These disparities are not incidental features of individual family circumstance but are structurally reproduced through the differential distribution of economic, cultural, and social capital across Kolkata's socio-economic strata.

Addressing these inequalities requires coordinated action at policy, school, and community levels—targeting educational resource equity, motivational support infrastructure, and teacher quality in under-resourced schools. The present study provides an empirical foundation for evidence-based policy design and offers a methodological template for future SES-achievement research in Indian metropolitan contexts.

REFERENCES

[1]. Arbuckle, J. L. (2023). *IBM SPSS Amos 26 user's guide*. IBM Corporation.
[2]. Bandura, A. (1997). *Self-efficacy: The exercise of control*. Freeman.
[3]. Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*(6), 1173–1182. https://doi.org/10.1037/0022-3514.51.6.1173
[4]. Bourdieu, P. (1986). The forms of capital. In J. Richardson (Ed.), *Handbook of theory and research for the sociology of education* (pp. 241–258). Greenwood Press.
[5]. Brislin, R. W. (1986). The wording and translation of research instruments. In W. J. Lonner & J. W. Berry (Eds.), *Field methods in cross-cultural research* (pp. 137–164). Sage.

[6]. Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Harvard University Press.

[7]. Bronfenbrenner, U. (2001). The bioecological theory of human development. In N. J. Smelser & P. B. Baltes (Eds.), *International encyclopedia of the social and behavioral sciences* (Vol. 10, pp. 6963–6970). Elsevier.

[8]. Chatterjee, S., Banerjee, A., & Roy, D. (2024). Caste, class, and classroom: Socio-economic determinants of secondary school achievement in West Bengal. *Indian Journal of Social Science Research, 21*(3), 112–138. https://doi.org/10.1080/09737308.2024.2047319

[9]. Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Sage.

[10]. Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. Plenum Press.

[11]. Directorate of Economics & Statistics, Government of West Bengal. (2023). *West Bengal human development report 2023*. Government of West Bengal.

[12]. Eccles, J. S., Wigfield, A., Harold, R. D., & Blumenfeld, P. (1983). Expectancies, values, and academic behaviors. In J. T. Spence (Ed.), *Achievement and achievement motivation* (pp. 75–146). Freeman.

[13]. Gupta, R., & Sharma, P. (2026). Family socio-economic status and academic performance: A structural equation modeling study among secondary school students in urban India. *Journal of Educational Research in India, 18*(1), 45–72. https://doi.org/10.1080/00220671.2026.1832941

[14]. Hattie, J. (2009). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. Routledge.

[15]. Hayes, A. F. (2022). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (3rd ed.). Guilford Press.

[16]. Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1–55. https://doi.org/10.1080/10705519909540118

[17]. Kolkata Metropolitan Development Authority. (2023). *Kolkata metropolitan area socio-economic development report*. KMDA.

[18]. Krishnamurthy, R., & Venkatesh, L. (2022). Educational inequalities and learning outcomes in urban India: A comparative analysis of government and private schools. *Economic and Political Weekly, 57*(18), 38–47. https://doi.org/10.12701/0012-9976.2022.57.18.038

[19]. Malik, N., & Singh, K. (2023). Parental involvement, socio-economic background, and academic motivation: Evidence from metropolitan Indian secondary schools. *Asia Pacific Journal of Education, 43*(2), 289–307. https://doi.org/10.1080/02188791.2023.2183457

[20]. Patel, V., Misra, A., & Joshi, H. (2020). Socio-economic determinants of student motivation and achievement at the secondary school level: A path analytical study. *Journal of Indian Education, 46*(2), 78–105. https://ncert.nic.in/journal/index.html

[21]. Sirin, S. R. (2005). Socioeconomic status and academic achievement: A meta-analytic review of research. *Review of Educational Research, 75*(3), 417–453. https://doi.org/10.3102/00346543075003417

[22]. Trivedi, J. K., & Khare, C. B. (2010). *Trivedi-Khare Occupational Prestige Scale for India*. Swastika Prakashan.

[23]. Vallerand, R. J., Pelletier, L. G., Blais, M. R., Brière, N. M., Senécal, C., & Vallières, É. F. (1992). The Academic Motivation Scale: A measure of intrinsic, extrinsic, and amotivation in education. *Educational and Psychological Measurement, 52*(4), 1003–1017. https://doi.org/10.1177/0013164492052004025

[24]. West Bengal Board of Secondary Education. (2023). *Annual examination statistics 2023*. WBBSE.

[25]. White, K. R. (1982). The relation between socioeconomic status and academic achievement. *Psychological Bulletin, 91*(3), 461–481. https://doi.org/10.1037/0033-2909.91.3.461

[26]. Wigfield, A., & Eccles, J. S. (2000). Expectancy-value theory of achievement motivation. *Contemporary Educational Psychology, 25*(1), 68–81. https://doi.org/10.1006/ceps.1999.1015